

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A crystalline silicon thin film semiconductor photovoltaic device comprising:

a conductive substrate or a substrate having on its surface a conductive layer;

a crystallographically oriented first polycrystalline silicon layer, which has been formed by introducing a metal catalyst element (i) into, or (ii) so as to come into contact with a surface portion of, an amorphous silicon layer, the amorphous silicon layer being formed on the surface of the conductive substrate or the conductive layer, and heat treating the amorphous silicon layer to crystallize the amorphous silicon layer that is formed on the conductive substrate or the conductive layer, and that includes a substantial amount of metal catalyst element at an outermost surface of the first polycrystalline silicon layer on the side of the conductive substrate or the conductive layer and only a trace amount of the metal catalyst element elsewhere within the first polycrystalline silicon layer; and

a second polycrystalline silicon layer that is formed on the first polycrystalline silicon layer and that has which has been formed without catalytic effect, using the first polycrystalline silicon layer as a seed crystal, so as to have the same conductivity type as the first polycrystalline silicon layer.

2. (Currently Amended) The crystalline silicon thin film semiconductor photovoltaic device according to claim 1, wherein the second polycrystalline silicon layer contains not less than 0.1% of hydrogen.

3. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 1, wherein the second polycrystalline silicon layer is crystallographically oriented in the thickness wise direction.

4. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 1, wherein the second polycrystalline silicon layer has the same crystallographic orientation as the first polycrystalline silicon layer.

5. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 1, which further comprises, provided on the second polycrystalline silicon layer in its side remote from the first polycrystalline silicon layer, a third polycrystalline silicon layer of a second conductivity type which is different from the conductivity type of the second polycrystalline silicon layer.

6. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 5, which further comprises, provided between the third polycrystalline silicon layer and the second polycrystalline silicon layer, a fourth polycrystalline silicon layer of a third conductivity type which is different from the conductivity type of the second polycrystalline silicon layer and the conductivity type of the third polycrystalline silicon layer.

7. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 5, wherein the third polycrystalline silicon layer has the same crystallographic orientation as the second polycrystalline silicon layer.

8. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 6, wherein the fourth polycrystalline silicon layer has the same crystallographic orientation as the second polycrystalline silicon layer.

9. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 6, wherein the fourth polycrystalline silicon layer has the same crystallographic orientation as the third polycrystalline silicon layer.

10. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 5, wherein the third and fourth polycrystalline silicon layers contain not less than 0.1% of hydrogen.

11. (Previously Presented) A crystalline silicon thin film photovoltaic device comprising:

a conductive substrate or an insulating substrate having on its surface a conductive layer;

a first polycrystalline silicon layer of a first conductivity type which has been formed by introducing a metal catalyst element (i) into, or (ii) so as to come into contact with a surface portion of, an amorphous silicon layer, the amorphous silicon layer being formed on the surface of the conductive substrate or the conductive layer, and heat treating the amorphous silicon layer to crystallize the amorphous silicon layer;

a second polycrystalline silicon layer which has been formed without catalytic effect, using the first polycrystalline silicon layer as a seed crystal, so as to have the same conductivity type as the first conductivity type;

a substantially i-type third polycrystalline silicon layer formed, without catalytic effect, on the second polycrystalline silicon layer;

a fourth polycrystalline silicon layer that is formed, without catalytic effect, on the third polycrystalline silicon layer and is of a second conductivity type which is different from the first conductivity type; and

an electrode part provided on the fourth polycrystalline silicon layer.

12. (Original) The crystalline silicon thin film photovoltaic device according to claim 11, wherein:

the conductive substrate is stainless steel; and

the substrate having on its surface a conductive layer is glass.

13. (Previously Presented) A crystalline silicon thin film photovoltaic device comprising:

an insulating substrate having on its surface an electrode;

a first polycrystalline silicon layer of a first conductivity type which has been formed by introducing a metal catalyst element (i) into, or (ii) so as to come into contact with a surface portion of, an amorphous silicon layer, the amorphous silicon layer being formed on the electrode of the insulating substrate, and heat treating the amorphous silicon layer to crystallize the amorphous silicon layer;

a second polycrystalline silicon layer which has been formed without catalytic effect, using the first polycrystalline silicon layer as a seed crystal, so as to have the same conductivity type as the first conductivity type;

a third polycrystalline silicon layer which is formed without catalytic effect on the second polycrystalline silicon layer and is of a second conductivity type which is different from the first conductivity type; and

an electrode part provided on the third polycrystalline silicon layer.

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Currently Amended) A crystalline silicon thin film ~~semiconductor~~
photovoltaic device, comprising:

a conductive substrate or a substrate having on its surface a conductive layer;

a first polycrystalline silicon layer having a first connectivity type, formed of (i)
an amorphous silicon layer disposed on the surface of the conductive substrate or

the conductive layer, and (ii) a metal catalyst element introduced into, or into contact with a surface portion of, the amorphous silicon layer, with the amorphous silicon layer being crystallized ~~crystallize~~ by heat treatment; and

a second polycrystalline silicon layer, having the same conductivity type as the first polycrystalline silicon layer, and being formed using the first polycrystalline silicon layer as a seed crystal.

18. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 17, wherein:

the second polycrystalline silicon layer is formed by plasma CVD.

19. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 17, wherein:

the second polycrystalline silicon layer is formed at a temperature of approximately 300° C or less.

20. (Currently Amended) The crystalline silicon thin film ~~semiconductor~~ photovoltaic device according to claim 17, wherein:

~~the first polycrystalline silicon layer includes a substantial amount of the metal catalyst element at a surface of the of the first polycrystalline silicon layer proximate to the conductive substrate or the conductive layer and only a trace amount of the metal catalyst element elsewhere~~ second polycrystalline silicon layer is formed without the metal catalyst element in the first polycrystalline silicon layer acting as a catalyst in the formation of the second polycrystalline silicon layer.

21. (New) A crystalline silicon thin film photovoltaic device comprising:
a conductive substrate or a substrate having on its surface a conductive layer;
a crystallographically oriented first polycrystalline silicon layer containing a metal catalyst element transformed from an amorphous silicon layer, the first polycrystalline silicon layer being formed on the surface of the conductive substrate or the conductive layer; and
a second polycrystalline silicon layer formed by using the first polycrystalline silicon layer as a seed crystal, the second polycrystalline silicon layer containing no metal catalyst element and having the same conductivity type as the first polycrystalline silicon layer.

22. (New) The crystalline silicon thin film photovoltaic device according to claim 21, wherein the second polycrystalline silicon layer contains not less than 0.1% of hydrogen.

23. (New) The crystalline silicon thin film photovoltaic device according to claim 21, wherein the second polycrystalline silicon layer is crystallographically oriented in the thickwise direction.

24. (New) The crystalline silicon thin film photovoltaic device according to claim 21, wherein the second polycrystalline silicon layer has the same crystallographic orientation as the first polycrystalline silicon layer.

25. (New) The crystalline silicon thin film photovoltaic device according to claim 21, which further comprises, provided on the second polycrystalline silicon layer in its side remote from the first polycrystalline silicon layer, a third polycrystalline silicon layer of a second conductivity type which is different from the conductivity type of the second polycrystalline silicon layer, the third polycrystalline silicon layer containing no metal catalyst element.

26. (New) The crystalline silicon thin film photovoltaic device according to claim 25, which further comprises, provided between the third polycrystalline silicon layer and the second polycrystalline silicon layer, a fourth polycrystalline silicon layer of a third conductivity type which is different from the conductivity type of the second polycrystalline silicon layer and the conductivity type of the third polycrystalline silicon layer, the fourth polycrystalline silicon layer containing no metal catalyst element.

27. (New) The crystalline silicon thin film photovoltaic device according to claim 25, wherein the third polycrystalline silicon layer has the same crystallographic orientation as the second polycrystalline silicon layer.

28. (New) The crystalline silicon thin film photovoltaic device according to claim 26, wherein the fourth polycrystalline silicon layer has the same crystallographic orientation as the second polycrystalline silicon layer.

29. (New) The crystalline silicon thin film photovoltaic device according to claim 28, wherein the fourth polycrystalline silicon layer has the same crystallographic orientation as the third polycrystalline silicon layer.

30. (New) The crystalline silicon thin film photovoltaic device according to claim 26, wherein the fourth polycrystalline silicon layer has the same crystallographic orientation as the third polycrystalline silicon layer.

31. (New) The crystalline silicon thin film photovoltaic device according to claim 26, wherein the third and fourth polycrystalline silicon layers contain not less than 0.1% of hydrogen.

32. (New) The crystalline silicon thin film photovoltaic device according to claim 25, wherein the third and fourth polycrystalline silicon layers contain not less than 0.1% of hydrogen.

33. (New) The crystalline silicon thin film photovoltaic device according to claim 21, wherein the first polycrystalline silicon layer is formed directly on the surface of the conductive substrate or the conductive layer.

34. (New) The crystalline silicon thin film photovoltaic device according to claim 1, wherein the amorphous silicon layer is formed directly on the surface of the conductive substrate or the conductive layer.

35. (New) The crystalline silicon thin film photovoltaic device according to claim 11, wherein the amorphous silicon layer is formed directly on the surface of the conductive substrate or the conductive layer.

36. (New) The crystalline silicon thin film photovoltaic device according to claim 13, wherein the amorphous silicon layer is formed directly on the electrode of the insulating substrate.

37. (New) The crystalline silicon thin film photovoltaic device according to claim 17, wherein the amorphous silicon layer is disposed directly on the surface of the conductive substrate or the conductive layer.